

**ABSTRACT OF THE DISCLOSURE**

Laser ablation combined with spectrometric analysis is a good tool for determining the composition of heterogeneous materials. By measuring the depth of an ablation crater at a target of a heterogeneous material, it is possible to generate a compositional profile as a function of the depth. It is also possible to generate a 3 dimensional profile by depth profiling of a plurality of craters. The depth measurement is conducted in situ and in real time so that the evolution of composition as a function of the depth can be measured. An interferometric technique with a short coherence length light is one of the preferred embodiments for measuring the depth in situ and in real time.